CORNELL UNIVERSITY
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PROGRESS REPORT

Evaluation of Skylab Imagery as an Information Service for Investigating Land Use and Natural Resources (Skylab), NASA Contract NAS 9-13364.

This report covers the period from June 1-31. The analysis of the interpretation of Skylab imagery for Long Island has been completed. Five principle categories of land cover can be identified from Skylab (S190A) imagery by their spectral response and pattern. The categories are: urban, residential, forest, water and agriculture. The urban category includes specific features such as airports, linear transportation and sand. Residential can be subdivided into heavy, medium and light development. Agriculture can be broken into bare fields, sod, and land with other cover (including pasture, crops, brush and old fields). Pine plantations can sometimes be distinguished from other forest types.

A sixth category, wetlands, was identified from ERTS imagery of Central and Northern New York. However, less than 3% of the extensive wetlands (salt marshes and tidal flats) of Long Island have been identified from either Skylab or ERTS imagery. It hasn't yet been determined whether wetlands can be identified from Skylab in other regions of the State.

Five types of data were compared on Long Island: color composites of S190A spectral imagery, S190B color film, ERTS imagery from Sept. 16, 1974, ERTS imagery from December 2, 1972 and April 24, 1973, and LUNR data from low altitude photography taken in 1968-70. The Skylab spectral data agrees most closely with LUNR. The agreement for each 10,000 hectare cell analysed was: 80.1%, 82.5%, 70.6% and 93.4%. (Agreement is determined by weighting of each category by category size and averaging). The average agreement with LUNR for these four cells is 81.6% for Skylab spectral (S-190A), 79.9% for the Skylab terrain (S-190B) and 73.2% for the ERTS.

The urban and residential categories were generally overestimated from Skylab, compared to LUNR, and forest and agriculture were underestimated. A great deal of residential and urban development is occurring in these regions. Thus some of the discrepancies between LUNR and Skylab probably reflect land use change in the 4-5 years since LUNR was completed.

The Skylab imagery shows more urban and residential land than was interpreted from ERTS. This is probably a function of the higher resolution of the Skylab imagery; especially where pattern has to be relied upon to distinguish between urban features and plowed land. The S190B imagery picked up the most residential land, probably due to its higher resolution.

An index of diversity of land cover types was developed by counting category interfaces using Skylab S190A data. The diversity of the cells ranged from 89 to 172. Diversity should be of value in land planning decisions. It would provide a gross estimate of land value for wildlife habitat. It may also indicate areas undergoing significant land use change. More study however will be required to assess the value of such an indicator.

The Tompkins County Planning Office was contacted this past month for two purposes 1) to introduce them to the Skylab data, both spectral and high resolution photography and 2) to obtain from them County planning objectives and information on the types of resource data they required to lay out adequate plans. They were particularly receptive to the S190B enlargement of the Tompkins County area (scale = 1:125,000). At the time of the meeting the interpretation of Tompkins County was not quite complete so this data was not discussed. The planning office did however, express interest in maintaining contacts and did desire to be informed on the progress of our study.

The County Planning Office is presently involved in a study to determine site and county suitability for different land use activities. Their study is a modification of McHarg's approach. As such the plan as its being developed may be able to use some generalized inputs from the Skylab data.

Preliminary results from the computerized color prediction model for determining types of diazo color composites are promising. However, additional work is required to develop suitable constraints to limit the number of possible combinations which the computer has to sort through. At present only two density points are contrasted, but with some satisfactory results it has been decided to attempt a model with three density point inputs. It is hoped that with a satisfactory model different composites can be produced to maximize color separation for different points in a scene.

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